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"THE SOCIOLOGY OF SCIENCE has two main purposes. The first is to provide instructive and readable material on science as a social phenomenon. Our second main purpose is to contribute to the further development of the sociology of science as a specialized field of research. It is perhaps all too easy to say of almost any part of society that it has not yet received sufficient scientific study. But whatever may be true in fact of various other parts of society, certainly there is a minimum of rhetorical and moral exaggeration in pointing to the neglect of the sociology of science."

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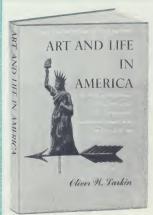
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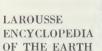
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the "stellar mortician" by his colleagues.

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In George C. Kennedy's "The Origin of Continents, Mountain Ranges and Ocean Basins," a whole host of classic problems of geology are solved with elegance and simplicity on the assumption that "Moho," the Mohoravic discontinuity, is a phase discontinuity between a less dense and a more dense

phase which are chemically alike.

In "Chromosome Reproduction and the Problem of Coding and Transmitting the Genetic Heritage," the equally elegant, if more complicated solution to these basic problems is recounted, beginning with the breakthrough in 1953 when the spirally twisted DNA molecule was first correctly mapped out. J. Herbert Taylor then brings us up to date in this very active research field.

A timely article on desalinization of water surveys the field completely, from wild schemes to tow Arctic icebergs to temperate regions to the practical installations which produce electrical power as a by-product; "Morphogenesis in Plants" recounts a series of experiments on vegetative propagation; and a detailed study of the way in which tobacco plants synthesize alkaloids yields some surprising results.

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William Vogt has written a brief and lively introduction. He is also responsible for the descriptive captions under each picture, which make of this book not merely a collection of historic and wonderful paintings of the bird (and flower) life of our country more than 100 years ago, but also an authoritative if rather elaborate guide to the identification of the birds of eastern North America today.



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By Jacob W. Getzels and Philip W. Jackson

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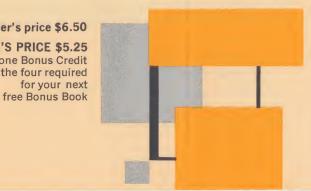
Drawing on the insights and methods of the behavioral scientist, two leading psychologists here set forth the findings of the most important investigation ever made into the relationships between high creative potential and high intelligence in adolescents.

Employing extensive batteries of both standard and specially devised intelligence, creativity, morality, psychological adjustment and scholastic achievement tests, the authors conducted intensive comparison studies of two groups of pupils-one group having tested high in intelligence but not concomitantly high in creativity, the other group high in creativity but not concomitantly high in intelligence.

Dramatically demonstrating how exclusive reliance on intelligence tests often impedes or prevents recognition of creative ability in artists and scientists, here are readable, provocative conclusions that suggest major revisions are due in commonly accepted concepts of creativity and the "gifted child," in the theories governing teaching and learning, and in the techniques for the measurement and evaluation of intellectual ability.

JACOB W. GETZELS, Professor of Educational Psychology, and PHILIP W. JACKSON, Associate Professor of Educational Psychology, are both associated with The University of Chicago.

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A Review by E. J. SHOBEN, JR.

Professor, Department of Psychological Foundations and Services Teachers College, Columbia University

ONE OF THE DIMENSIONS of human activity urgently in need of cogent and relevant exploration has long been creativity, the production of the novel and the unexpected. We know little about the character or the antecedent determinants of artists, scientists, humorists and people in all walks of life who bring the quality of inventiveness to both their work and their play.

In CREATIVITY AND INTELLIGENCE, Jacob W. Getzels and Philip W. Jackson, two well-known members of the faculty of educational psychology at the University of Chicago, bring us one of the first full-scale studies of inventive persons.

Beginning with the provisional but sound assumption that the IQ need not tell us much about individuals who can produce new forms or restructure existing stereotypes, they expose us to a wide range of richly reported observations of children working at a wide variety of problems. It is in this finely textured exposure to actual instances of creative behavior that one finds the cogency and relevance of this fascinating and valuable book.

From the data presented here, it seems clear that intellectual brightness of the conventional sort is essential to creative behavior up to a point-roughly, around an IQ of about 115. Beyond that point, conventionally understood intelligence and creativity are strikingly independent. Indeed, children who are highly creative and those who are highly intelligent seem to differ in their moral and personal values, the ways in which they employ their imaginative capacities, their career aspirations and their family backgrounds. But quite apart from the correlates of creativity, the descriptions presented here of creative behavior itself, in the context of both challenging tasks and complex personalities, amount to an opportunity for all of us to examine inventiveness in action and

to reflect on the distinctive flavor of the creative act over its many varieties.

In the best and most heuristic sense, Creativity and Intelligence is a casebook, leading more to deepened insights and new hypotheses to guide our own search for an understanding of giftedness than to a systematic and formal theory. Such a theory would be premature, and its achievement would only be attained at the expense of the very cogency and human relevance that make Getzels and Jackson's book such a provocative and exciting one.

Anyone concerned with education, anyone who includes the fulfillment of the individual among his moral touchstones, and anyone who is curious about that most remarkable of all human traits, the tendency to produce novelty, will find this a delightfully rewarding document.

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A Review from SCIENTIFIC AMERICAN

FREUD'S MAJOR STUDIES of dreams, sexuality, totemism and so on have long been available to the English-speaking public; his clinical investigations, however, which may be regarded as the basis of his grand system, were long buried in a foreign tongue. This central lacuna [has now been] filled with the publication... of five volumes devoted to English translations of Freud's Sammlung kleiner Schriften zur Neurosenlehre.

The papers go back almost to the beginning of Freud's professional career—the first, an essay on J. M. Charcot, appeared in a Vienna medical weekly in 1893—and conclude with a fragment, "Some Elementary Lessons in Psychoanalysis," written in 1938 and published posthumously in 1940. Thus they afford a unique picture of the development of Freud's work, disclosing, Ernest Jones says, "a beautiful example of the way in which ideas are gradually unfolded—and constantly extended and modified—under the pressure of widening and deepening experience."

Freud was not inflexible; he was sensitive to fresh material, could learn, could make detours, embark on new paths, even "retrace his steps." But his basic beliefs, as is plain to see, remained pretty firm, and he possessed the necessary skill and imagination to make the windings artistically fit the core. This is what gives his systems its coherence, strength and symmetry; this is why it continues to exercise a formidable influence, almost as much upon those who would modify or even repudiate it altogether as upon those who regard it as sacred and complete.

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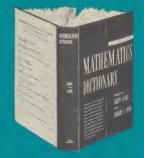
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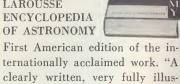
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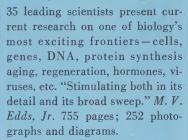
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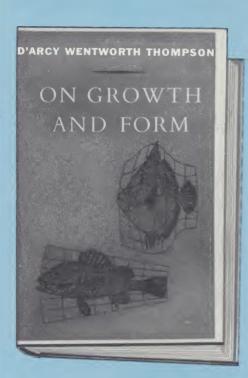
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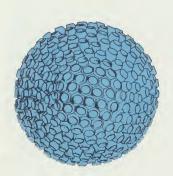
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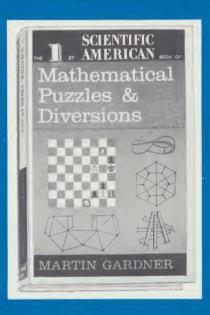


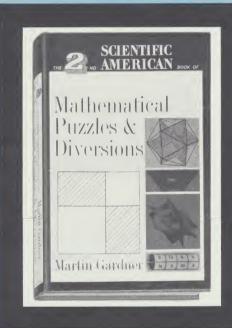


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BOOK NEWS

Vol. VIII, No. 6 / February, 1962

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As Vannevar Bush, Honorary Chairman and Life Member of the Corporation, Massachusetts Institute of Technology, recently observed, "Martin Gardner accomplishes the seemingly impossible. He has produced a work which will be enjoyed by the nonspecialist and which will also make a good mathematician scratch his brow in perplexity."

A Review by

WILLIAM L. SCHAAF

Professor of Education, Brooklyn College Member, National Council of Teachers of Mathematics

As Christopher Morley once observed: "There is no imaginable mental felicity more serenely pure than suspended happy absorption in a mathematical problem." Mankind's appetite for puzzles is insatiable; the appeal of a paradox is irresistible. These remarks apply to mathematical diversions as much as to other amusements—possibly even more.

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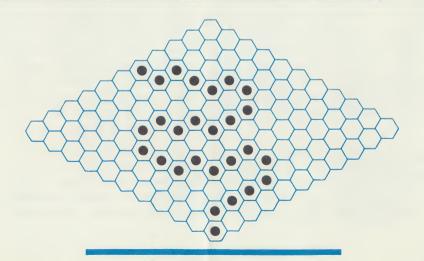
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content. The flavor is distinctly modern, the prose is crisp and the explanations are remarkably lucid. Again and again we are shown the relation between the *playful* side of mathematics and the *serious* side of mathematics. "The best mathematics," said the eminent British mathematician G. H. Hardy, "is serious as well as beautiful." By the seriousness of a mathematical idea we mean the significance of other mathematical ideas which it connects. Only a creative mind could show this relation between pure play and pure mathematics, and Mr. Gardner has done just that with consummate skill.

To be sure, some classical recreations reappear upon the scene: the game of NIM; the Tower of Hanoi; the Icosian game; the Fifteen puzzle; magic squares; the five Platonic solids; mazes and labyrinths; the Chinese tangram. So do a few of the more familiar logic puzzles: the counterfeit coins; the colored hats; the engineer, the brakeman and the fireman; the water and wine exchange; the Liars, the Truthtellers and the fork in the road; the ten travelers in the nine hotel rooms; and the monkey and the coconuts. But they are all retold with stimulating freshness.

More fascinating, however, is the wealth of new material presented. Take the hexaflexagons, for example—those innocent-looking paper polygons, folded from strips of paper, which have a tantalizing way of changing their faces when they are "flexed." Or consider Ticktacktoe. What is there about this seeming child's play that makes such an ageless appeal? In the contemporary jargon of game theory, this is a two-person, "finite" contest, with no element of chance, played with "perfect information"; if played rationally by both contestants, the game must always end in a draw. It can be played on cubical boards; even four-dimensional ticktacktoe is possible, played on an imaginary hyper-cube. The ancient Japanese game of go-moku, played with five stones, and its variant in

Victorian England under the name of *go-bang*, are both mathematically related to ticktacktoe. Here is an example of the connection between mathematics in fun and in earnest.

With a pair of scissors, a bit of Scotch tape and some picture wire, you will stay up half the night making all sorts of Moebius bands and other curious topological models, including interlocking closed curves that can be separated without "breaking" either of them.

If you think playing Chinese checkers is fun, try playing the new game of HEX. This is played on a diamond-shaped board made up of regular hexagons, usually having eleven hexagons on each side. The game is of particular interest to game theorists, because, although no "decision procedure" is known which will always win on a standard board, it is possible to give an "existence proof" that there is a winning strategy for the first player on a field of any dimensions.

Polyominoes are sophisticated dominoes. More realistically, a polyomino is a "simply connected" set of congruent squares. If you take an ordinary familiar domino, forget about the spots, and break it in half, you will have two monominoes. If you join three monominoes along their edges, you get two types of trominoes. There are five distinct varieties of tetrominoes (sets of four squares), and twelve varieties of pentominoes. Many unexpected patterns can be made with such polyominoes, leading to interesting proofs and "plausible reasoning" in combinatorial geometry.

Then there are the irresistible Soma cubes; the Golden ratio, which pops up where least expected; the subdivision of a square into unequal smaller squares; Origami, the ancient Japanese art of paper folding; and, last but not

least, the mirror that does not reverse images. And still we haven't mentioned several intriguing mathematical card tricks, an amazing collection of mechanical puzzles, an induction game played with an ordinary deck of cards, an exciting assortment of algebraic and geometric fallacies, and a number of subtle probability paradoxes.

Mr. Gardner's two entertaining and stimulating volumes are destined to take their place side by side with such classics as those by Lucas, Ahrens, Dudeney, Sam Loyd, Rouse Ball, H. S. M. Coxeter and Maurice Kraitchik. No lover of mathematics can afford to miss these books, first, because of the author's delightful commentaries and asides; secondly, because so much of the material is fresh and new; and, finally, because Mr. Gardner has been eminently successful in linking mathematical recreations to important aspects of modern mathematical thinking.

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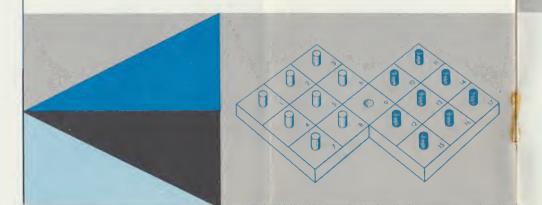
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Martin Gardner, a regular contributor to Scientific American, is the author of Fads and Fallacies in the Name of Science, Logic Machines and Diagrams and The Annotated Alice.

Our reviewer, WILLIAM L. SCHAAF, an authority on expository mathematics, is a member of the National Council of Teachers of Mathematics and author of the comprehensive checklist, Recreational Mathematics.

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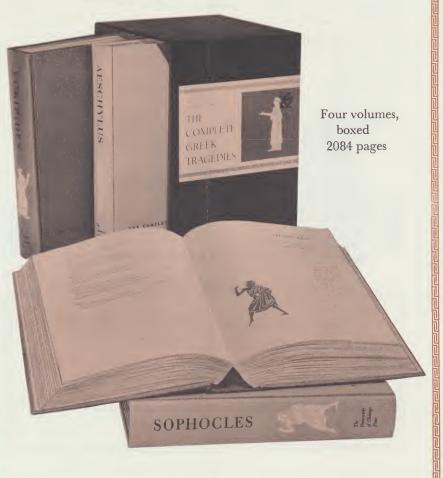
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A Review by

KENNETH REXROTH

Nothing gives a case-hardened reviewer more pleasure than the chance to say, "This is it. No qualifications. Go out and buy it, everybody." This project is a major event in American scholarship and far from a minor event in American poetry. We have produced something over here to match the great Tudor and Victorian translators. (Yes, the Victorians were great translators. We just aren't Victorians, so they seem Victorian to us.)

Where do you begin with such a feast of good things? David Grene, William Arrowsmith, Rex Warner are all very good poets and for my taste Richmond Lattimore and John Frederick Nims are especially fine ones. Many of the others may have published good poetry under their own names that I am not familiar with; certainly here, working with the Greek text, they come off very well—without exceptions. Of course, some are better than others, but none are bad. None of the plays are anachronistic or hobbyhorse perversions of what the Greeks actually said. They are all clear, accurate reflections of the Greek in well-polished mirrors of contemporary American language and taste. Not just language and taste; although they are far from being play-book "treatment," they are eminently actable—at least they are when the Greek is.

The beautiful typography, the satisfying paper, chaste decorations have been climaxed in this complete work by a stroke of genius. The box is an "off black," with a terra cotta band... and the books—four volumes lined up, Aeschylus, Sophocles, two volumes of Euripides—in beautifully graded tones of terra cotta, volume by volume, from cream to Venetian red. What a joy to see!

Here in these plays, as in Homer, is life as it really is, men as we really are, when we beat our wives or cheat our grocer or plan our perfect societies or run for office or write our poems—but projected against the empty and splendid heavens, and made noble. Take away the costumes and the grand language, the same pride, the same doom, that haunts Orestes also haunts every public accountant, every housewife, every salesman. (From The Nation)

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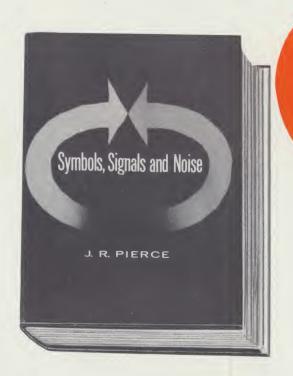
ABOUT THE EDITORS

DAVID GRENE is Associate Professor of Classical Civilization at the University of Chicago. RICHMOND LATTIMORE is Paul Shorey Professor of Greek at Bryn Mawr College.

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JOHN R. PIERCE One of the foremost authorities in the technology of high-frequency electronics, microwave radar and communication techniques, Dr. Pierce is Director of Research in Communications Principles at the Bell Telephone Laboratories, with which he has been associated since 1936.

In his newest work, SYMBOLS, SIGNALS AND NOISE—the current Selection—Dr. Pierce presents basic concepts of communication theory, and draws on his wide-ranging experience to demonstrate their application to the electrical and mechanical transmission

of messages, to the behavior of machines, to

physics, and to language, psychology and art. Essentially mathematical, proceeding from clear and definite hypotheses to theorems concerning information sources and communication channels, Dr. Pierce's arguments are presented with the refreshing simplicity, conciseness and lucidity that distinguish allof his contributions.

Inits recent review of SYMBOLS, SIGNALS AND NOISE, SCIENTIFIC AMERICAN observed, "There are, it may be granted, many writings on communication theory...but Pierce's volume presents the most satisfying discussion to be found of the technical business as well as of the more digestible generalizations and philosophical speculations."

A Review by

WARREN WEAVER

Vice-President, Alfred P. Sloan Foundation Past President, American Association for the Advancement of Science

JOHN R. PIERCE has a stubborn, original and good mind. His interests and his store of knowledge extend over a remarkable range. He has a lively sense of humor and a refreshing lack of stuffy solemnity. He establishes a warm and friendly rapport with his reader. He writes clear, informal and interesting sentences, almost completely free of trite expressions. However abstruse his topic, he keeps inserting specific and illuminating bits of information which give the reader something very solid and comforting to hold onto.

I don't think John Pierce *could* write a poor book; and certainly SYMBOLS, SIGNALS AND NOISE is a good one. If parts of it seem to me more successful and stimulating than other parts, this is largely a reflection of the fact that the author is incapable of dull uniformity.

Dr. Pierce has spent a quarter century in the Bell Telephone Laboratories. This fact, and the great additional fact that BTL scentists have played such clearly leading roles in the development of the mathematical theory of communication, quite inescapably bring it about that a considerable portion of this book—indeed, practically all the pages concerned directly with communications theory—is devoted to an exposition of the basic work initiated largely by Hartley and Nyquist and brought into full and marvelous maturity by Shannon.

This central core of the book—attractively spread over several chapters and interlarded with rather different material—is concerned with the sense (as one first meets it,

the rather queer sense) in which the word information is used in communication theory, and with "the ideas of the information rate or entropy of an ergodic message source, the information capacity of noiseless and noisy channels, and the efficient encoding of messages produced by the source, so as to approach errorless transmission at a rate approaching the channel capacity."

His long and intimate familiarity with the now classical theorems of Shannon has in no slightest way dimmed Dr. Pierce's sense of excitement at the power, generality, elegance and unexpectedness of these results. His intensely practical association with all these ideas enables him to offer, time after time, very interesting and specific illustrations of the use of theorems which might otherwise seem rather tenuous and vague.

It is, for example, fascinating to see precisely how one may devise an error-correcting code which employs check symbols in addition to the message symbols, the entire pattern being so cleverly interlocked that, in the received message, one can be certain to spot any error in the check symbols also. It is fascinating to understand why 60 words a minute could theoretically be transmitted from the vicinity of Mars to a 150-foot-diameter receiving antenna on the earth, using a power of only three-thousandths of a watt!

The aspects of the book that seem less felicitous to me are the following: In Chapter One, the first example to illustrate the nature of mathematical proof (the game called "hex") is both trivial and unnecessarily complicated. In the early chapter on the origins of information theory, Dr. Pierce seems almost to resent any influence other than that arising in electrical communication. The relation between entropy as defined in information theory and as defined in statistical mechanics he considers "confused and confusing." He makes no reference to the work of L. Brilloum, which, it seems to this reviewer, sets forth that relation in

a most fruitful way. The author also makes no reference to the concept of information as it was developed in mathematical statistics by R. A. Fisher and others.

Once in a while a page or two seem to be hastily written and not carefully revised, with the result that the exposition is unnecessarily difficult. Once in a while the author forgets that to a general audience such a phrase as "telegraph wires are linear" may have a geometric rather than a logical or analytical connotation. Once in a while his friendly wish to carry his reader along with him leads to some exaggeration, as when, in one instance, he says, "we have now firmly arrived..." when he really means, "I hope the reader is, by now, willing to believe that..."

But broadly speaking, SYMBOLS, SIGNALS AND NOISE is exceedingly good exposition – interesting, clear and stimulating.

The portions devoted to "Language and Meaning," to "Cybernetics," to "Information Theory and Psychology" and to "Information Theory and Art" seem to me absolutely first-rate, and full of sound common sense. These portions contain a lot of material not available elsewhere, and they are illumined by Dr. Pierce's great knowledge, his originality, his refreshing informality of style and his healthy freedom from cant.

The usefulness of the book is materially increased by a good index, a fine eight-page glossary of terms, an appendix on mathematical notation and very skillful summaries at the end of each chapter.

In formal mathematical writing one practically always needs to understand one sentence before proceeding to the next, for mathematical structure is built brick by brick, each resting on the preceding. Dr. Pierce does not write this way. He sneaks up on, skirts around, and only gradually closes in on, his argument. He himself says at one point, "justification will become apparent only as we pro-

ceed." So if, at the beginning, you do not find a completely satisfying and precise definition of "information," do not despair. Indeed, do not even worry. Everything comes out happily in the end.

I am sure that SYMBOLS, SIGNALS AND NOISE will be widely read and appreciated.

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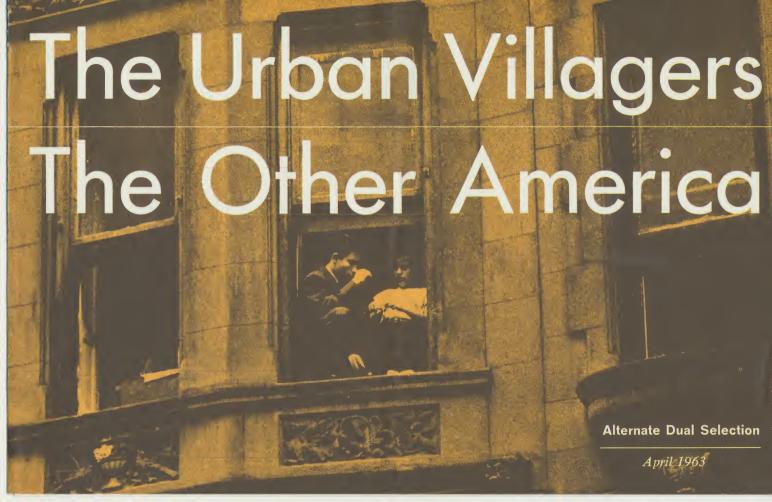
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One of the most provocative theses of Harrington's book, one which should arouse considerable controversy, concerns his belief that a major deterrent to the removal of poverty lies in the attitudes and values of the poor themselves. He feels that these people have been defeated by poverty, that they are pessimistic and fatalistic, lacking in spirit and will. "First and foremost, any attempt to abolish poverty in the United States must seek to destroy the pessimism and fatalism that flourish in the other America." Because of the grouping together of different types of poverty (aged, unskilled labor, young, Negroes, migrant groups) it is difficult to argue this point, but I feel that there is considerable contradictory evidence when one examines each of the groups separately. (The Negro protest movement, senior citizens' lobbies, positive attitudes toward education held by high percentages of "lower class" individuals according to various polls — to mention just a very few illustrations—do not lend support to Harrington's argument). One might wonder whether the resistance of the poor (to being helped) might not be more related to the practices and attitudes of the middle agencies (the "caretakers" to use the Gans-Lindemann formulation) who are concerned with aiding them.

This brings us to Gans' brilliant "inside" picture of the culture and psychology of "working class" (those employed in relatively stable skilled or semiskilled jobs) and "lower class" groups (those employed in unstable and unskilled jobs). From October 1957 to May 1958, Gans lived in an inner city Boston neighborhood called the West End, inhabited largely by second-generation Italians (42% of the West End population are Italian). His study based on intensive participant observation including formal and informal interviewing, visiting, attendance at meetings etc., provides us with the best and fullest description of working class life and culture that I have read.

One of the major contributions of the book (and one which has special implication for the practitioner) is the typology developed by Gans in subdividing the West Enders. "These are: <u>maladapted</u>, the <u>middle-class mobiles</u>, and—the two most important ones — the <u>routine-seekers</u> and <u>action-seekers</u>. The former is based on the search for a routine life, and the latter, on the pursuit of adventurous episodes, or what West Enders call 'action'." While the action-seekers are more likely to be in the lower class, Gans notes that not all action-seekers are lower class. Routine seekers are more often found in the working class.

photographs by Jay Maisel



Herbert Gans' THE URBAN VILLAGERS and Michael Harrington's THE OTHER AMERICA are absolutely indispensable reading for everyone concerned with the "poor" or the "lower class" in America. Doctors, educators, politicians, urban planners, psychiatrists, and social workers alike will find crucial, penetrating insights regarding the "culture of poverty" in these two works.

Harrington in a vivid, spirited prose, clearly documents the pervasive nature of poverty (between forty and fifty million people, hardly "pockets" of poverty), and its disproportionate distribution among minority groups, the aged, unskilled labor, migrant labor, children, female based families, and people with little education.

Moreover, Harrington notes that present day poverty, in contrast to the poverty in the thirties, is largely <u>invisible</u> to the rest of the nation. This is true for a variety of reasons including the transformation of the city with the consequent segregation of the poor from the middle class suburb. Of particular importance is the fact that todays' poor are politically invisible. Unlike the immigrants of an earlier period in American history and unlike the poor of the Thirties, todays' "minority poor" are not the concern of the politician.

A Dual Selection:

The Urban Villagers

The Other America

By Herbert J. Gans

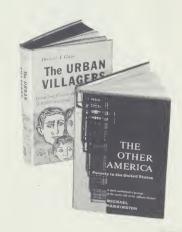
By Michael Harrington

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It is extremely important for the "middle class observer" and the practitioner to note the difference between the "impulsive action-seekers" and the maladapted group—"the people who are entirely unable to control their behavior because of alcoholism or other personal difficulties." The action-seekers pursue episodes within a context of rules, and do not cut themselves off from family and peers, whereas "the maladapted may be mentally ill, and lack the self-control and contact with reality to function in these groups." The confusion of these two groups leads to an exaggeration of pathology among lower class groups and to considerable misunderstanding regarding the meaning of their behavior.

Gans closes with a fascinating Epilogue in which he describes the West Enders' reactions to the destruction of their neighborhood (for urban redevelopment) and "the planning that was done — and not done — for the relocation of the West Enders."

THE URBAN VILLAGERS and THE OTHER AMERICA, the Alternate Dual Selection for The Basic Book Service for April, 1963, are available in addition to or instead of the Main Selection.

a comment from The New Scientist

This admirable survey should be widely read and widely owned. To it, Dr. Hart brings an informed and systematic scholarship. A lifelong enthusiast for his hero, he earns our gratitude for keeping well "this side of idolatry." The range of Leonardo's "anticipations" is astonishing. Even more interesting are his "explanations" and Dr. Hart's careful conjectures as to the reasons for the almost entire "failure of communication" with his contemporaries. The book has clearly been a labor of love.

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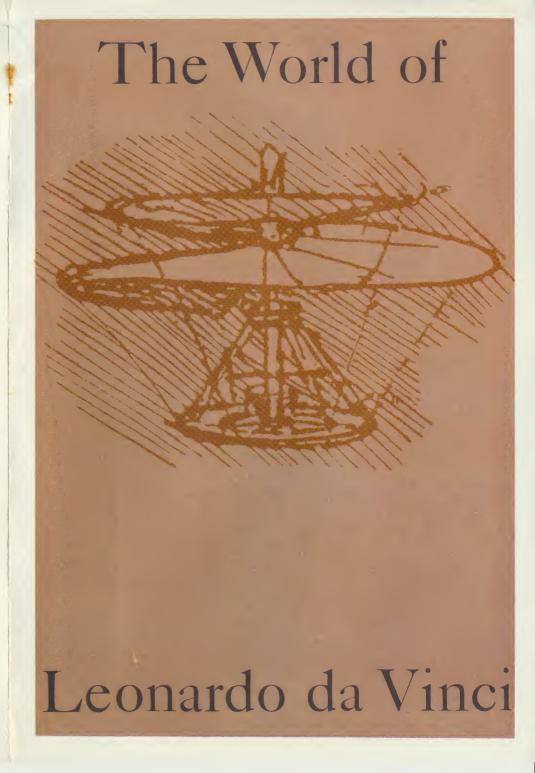
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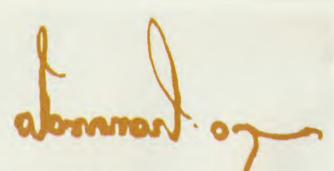
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- The Problem of Leonardo's Influence on Scientific Progress

THE WORLD OF LEONARDO DA VINCI, Alternate Selection of The Library of Science for September 1962, is available in addition to or instead of the Main Selection.





Virtually alone in the history of civilization, Leonardo Da Vinci transcends the limitations of time and place. With the passage of centuries, his renius becomes increasingly apparent.

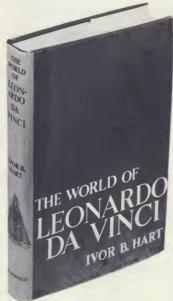
Leonardo's interests encompassed all of life and the known universe, and the excellence of his gifts was apparent in all that he touched. His openmindedness and receptivity to impressions, observations and ideas, his creativity and ingenuity demonstrate, even at this distance, an extraordinary mind. With his remarkable affinity for a variety of complex subjects far in advance of his time, it is not far-fetched to call Leonardo the first Twentieth-Century Man. Even among such imposing examples of genius as Aristotle, Newton, Galileo, Shakespeare, Einstein, Mozart, Darwin and Freud, he has no peer for sheer versatility of intellect and for the dazzling variety of his achievements.

How is that until now there was no really adequate appreciation and evaluation of Leonardo, his importance and influence? Perhaps a lengthy perspective of time was needed before so towering a figure could be viewed in all his stature? Or was it that a truly perceptive appraisal had to wait until *our own* time — a time to which he is so close in mentality, temper and outlook?

Whatever the reason, in this new book by the eminent British historian of science, Ivor B. Hart, Leonardo at last stands before us in the full splendor of his glittering intellect — man of science, of art, of humanism, observer, student, experimenter, engineer supreme. Here indeed is a *fascinating* book on one of the most fascinating figures in all of science.







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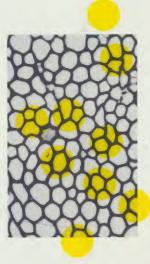
Alternate Selection

September 1962



September 1962

the links, the gaps, the sources, the destination



What are the relationships between different forms of life as they now exist? We know (up to a point) how living things evolved to their present state, but what lies ahead? What basic processes or organizational structures distinguish living from non-living things? And if, as some think, we are on the verge of isolating these factors, what will man do with this awesome knowledge?

These are some of the questions that preoccupy biologists today. They find eloquent, probing expression in the pair of new books that comprise the current Main Selection. Taken together (we suggest that "The Ideas of Biology" be read first), these provide a concise, sweeping, up-to-date look at research and speculations on the "growing edges" of the life sciences — as seen through the eyes of two of the best-qualified observers in the world, outstanding biologists who deservedly rank with the most gifted scientific writers of our time.

John Tyler Bonner's

The Ideas of Biology

reviewed by Gerald Wendt

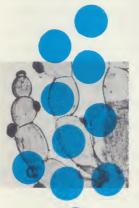
Director, UNESCO, Publications Center

Biology as such has seldom been taught in our schools. Botany and zoology have given factual descriptions of plants and animals with their structures, physiology and mutual relations. But the concepts that bring understanding have been slow to develop and much slower to reach the textbooks and popular works. Save only for evolution, they have hardly been mentioned — and even evolution, a hundred years after Darwin, is widely ignored in deference to prejudiced ignorance.

The great achievement of this little book is that it presents the basic concepts of biology in concise, lucid, orderly form and thus gradually and understandably transforms the miracle of life into a succession of miraculously simple processes.

Under the pervading concept of evolution, the first topic is the unit of life, the living cell with its genes that are just chemical molecules yet constitute the code that determines all else. That code controls the life of the cell and of all its descendants in the genetic processes that develop the egg into a new being, then control its development into an adult of specific traits, and finally also influence the behavior of colonies and even societies of related organisms. In the final chapter these ideas are focussed on man himself and include his ecological relation to his natural environment and his effect on that environment and thus on his own future.

If we are to deserve and wisely use the new knowledge that biology will yet reveal, it is high time that every intelligent person mastered the fundamental present ideas as portrayed in this unique book. (Reprinted from the New York Herald-Tribune Book Review.)



C. H. Waddington's

The Nature of Life

reviewed by Curtis A. Williams, Jr.

Laboratory of Biochemical Genetics
The Rockefeller Institute for Medical Research

C. H. Waddington is one of the world's foremost scholar-scientists, and "The Nature of Life" is most worthy of his reputation. The exposition is lucid and engrossing. Indeed, the reader is treated to a stimulating romp through the main trends of thought during the transition of biology into a science and the development of the natural philosopher into an experimental biologist.

The interplay of atomistic and continuum theories is presented as characteristic of biology. The principle is clearly illustrated by a detailed discussion of gene structure, nucleic acids, and the genetic code representing the atom-

istic approach to understanding the nature of living material. It is recognized, however, that these discoveries find biological context only in a continuum system such as chromosomes, cells, organs and a living organism adapting to its environment.

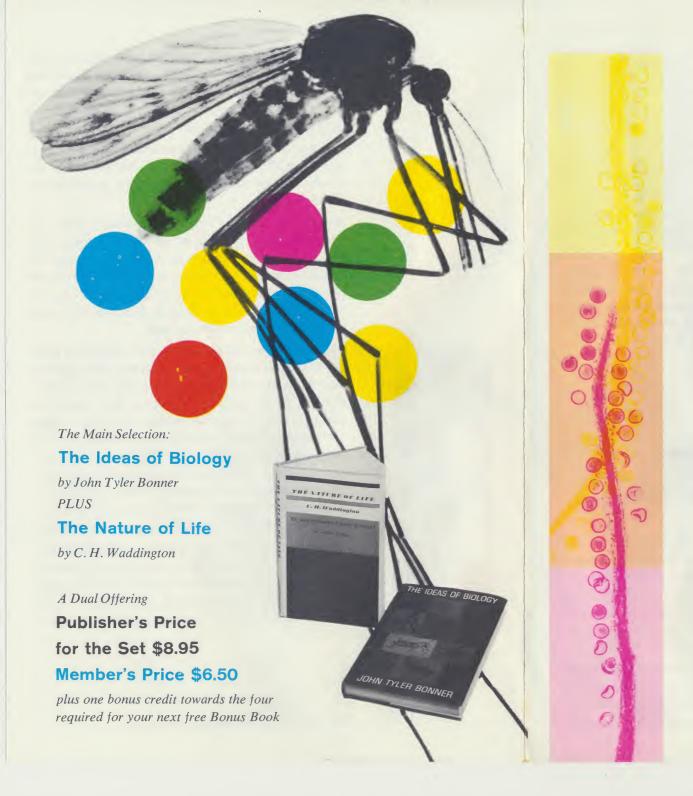
Regulation and control of the development of the organism is treated in terms of cybernetic interactions in the continuum system, which may be investigated atomistically.

Theories of evolution, we learn, antedate Darwin by more than 2000 years. Even among the Greeks there was a controversy concerning evolutionary change by chance or by intelligent design; Waddington's discussion of evolution is superlative. Our modern notions are carefully developed within a scholarly, historical framework of contrasting and reinforcing ideas.

Man, the highest achievement of the evolutionary process, possessed of culture, self-awareness, and apparent free-will, is in a fascinating position. He must convince himself that his mentality, a product of as well as the originator of his theory of evolution, is qualified to judge the theory's validity. Can man then willfully affect his own evolution? How free is his will? And is this a biological problem which can be investigated by the application of atomistic or continuum theory, cybernetic or indeterminacy principles? These are some of the questions raised and discussed in Waddington's final chapter.

"The Nature of Life" is penetrating and stimulating — but it should be read for pure enjoyment. Because the material in it is necessarily an essence, to be fully appreciated it should be assimilated in one swallow — and it will be found, even by the informed layman, quite digestible!





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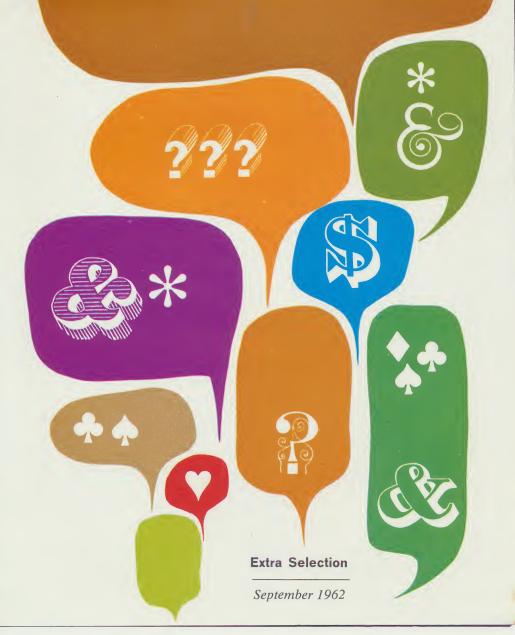
About the Authors

JOHN TYLER BONNER, author of "The Ideas of Biology," is one of the best-known and most articulate biologists in America today. Professor of Biology at Princeton University, he has published widely, including such books as "Cells and Societies," "The Evolution of Development," and others. In 1955 he won the Selman A. Waksman Award for contributions in the field of microbiology.

The distinguished British biologist, c. H. WADDINGTON, is Buchanan Professor at the Institute of Animal Genetics, Edinburgh University. The possessor of one of the outstanding prose styles among scientists today, Dr. Waddington has received high acclaim for his extensive writings on science for the general public — particularly on questions of science and ethics. His other books include "The Scientific Attitude" and "The Ethical Animal."

THE IDEAS OF BIOLOGY and THE NATURE OF LIFE together comprise the Main Selection of The Library of Science for September 1962.

Towards a scientific theory of thinking





What is thinking? Is it a process of conscious awareness, or at least of consciousness? If so, what about dreams and other unconscious thought? Is it learning and remembering, even if involuntary? Then what about forgetting? How to account for scientific thinking, for creative artistic thinking, for schizophrenic thinking?

These are some of the questions that preoccupied David Rapaport, Research Associate at The Austen Riggs Foundation at his untimely death a few years ago. Mathematician, physicist, psychologist, student of anthropology, sociology and psychoanalysis, Rapaport collected what he deemed the important examples of investigations into thinking from the point of view of its motivation. To Rapaport, this provided a conception of thinking which he hoped would eventually include, within a unified, scientifically testable framework, all forms of human thought-process - consciousness, remembering, forgetting, perceiving, unconscious thinking, fantasythinking, imagery, hallucinations, ordered everyday thinking, logical thinking, scientific thinking, productive and creative thinking of all kinds, both normal and pathological.

In this modern classic he presents 27 of the collected investigations, with unifying commentary. He caps them with his own theoretical formulations toward a theory of thinking. As the Journal of Abnormal and Social Psychology observed: "All these studies reveal not only the multi-layered organization of thinking but also its ramified interlocking within the person as a whole, however conceived....The combination of theorizing, experimentation and penetrating analyses of individual cases in this book demonstrates anew how careful examination of qualitative data may help the search for relevant hypotheses and quantification."

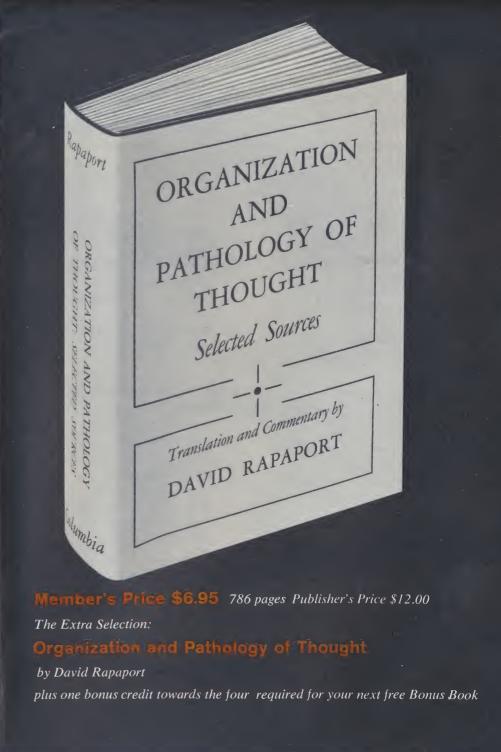


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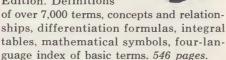
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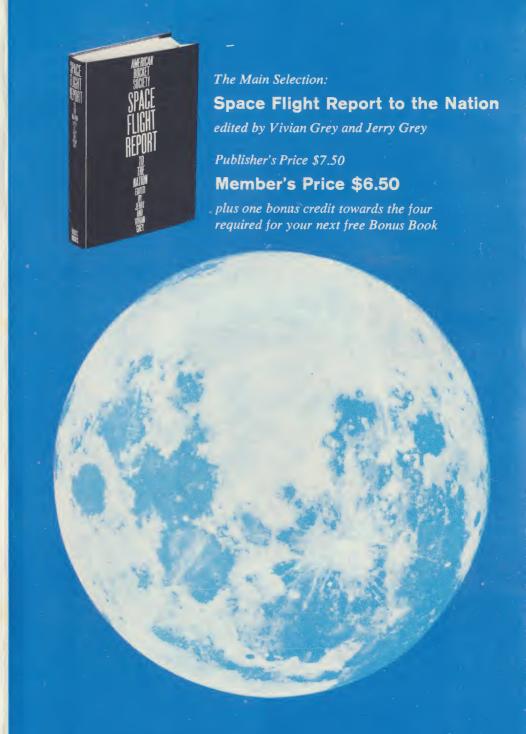
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SPACE FLIGHT REPORT TO THE NATION is one of those current, historical, yet predicting-the-future books that appears only rarely on the contemporary scene. In reading its pages, and remembering my own reactions to the initial announcements of successful achievement of orbit, it is difficult to believe that this age of space burst upon us only five short years ago with the launching on October 4, 1957 of the Soviet Sputnik I. In those five years much has happened that needs to be chronicled and much has been learned that needs to be recorded.

In October of 1961 the American Rocket Society decided that something should be done about the lack of knowledge of space programs that existed in the United States. A group of experts were asked to report on their work and their aims at the Rocket Society's meeting in New York. Typical of the experts asked to discuss the space program were Wernher von Braun, Bernard Shriever, Krafft Ehricke and Phillip Morrison. Their report is the substance of SPACE FLIGHT REPORT TO THE NATION.

The history of the space age is so short yet so full of effort, successes and failures that even experts are confused about particular developments and trends. It is not unusual in such a kaleidoscopic scene that the nonspecialist often wonders about the broad program and our immediate as well as more distant objectives. SPACE FLIGHT REPORT TO THE NATION does much to fill the gap which existed and goes far towards serving as a chronicle of space efforts in the past.

In reading this book, a feeling I have long held was transmitted and reinforced. It becomes evident that the attack on the space environment is a diffuse and multidisciplined endeavor. Engineers need the help of physicists, physicists, of chemists; chemists, of biologists. No longer is it sufficient to understand a particular compartment of knowledge. To succeed, a broader understanding of problems facing men in their efforts in space is needed. The space environment is not responsive to the fact that a man is a physicist, a chemist or an engineer. Space is a taskmaster for *scientists*, and its prob-



lems exert a tremendous unifying force on the scientist and on his training. This fact becomes abundantly clear in reading SPACE FLIGHT REPORT TO THE NATION.

One of the questions that has to be asked of any new publication is "Does it fill a need?". Surely this book does. We are besieged every day with new accomplishments — a Discoverer is recovered, the Ariel is inoperative, Telstar succeeds. The headlines are thrilling, and occasionally (as in the case of Telstar) the results are evident. But how and why are the experiments tried. What satellite gets priority? In short, what are we trying to do?

In the pages of SPACE FLIGHT REPORT TO THE NATION, some of these questions are answered. Dr. Reichelderfer tells us of some of the immediate uses of satellites in predicting weather. Dr. Hawkins tells us why men must go into space. Dr. Morrison tells us of the search for life outside the planet earth. A clear, concise description of the uses of space has long been missing. The contents of this book serve to supply that needed information.

In a book, composed of the work and contributions of many authors, there is bound to be uneveness and at times overlap. This is true in SPACE FLIGHT REPORT TO THE NATION as in any other similar work. Fortunately, the division of the contributions along the functional lines of Missions (where we want to go), Vehicles (how we're going to get there), The Global Effects (the strategy and implications of space flight), and the U.S. vs. U.S.S.R. (divergences, similarities, and relative state of advance) have held overlap to a minimum.

The division, too, has made the reading of the book a much easier task. If a confusing note remains, it remains because of the addition of material to the reports actually presented at the meeting. For example, Telstar and the orbital flights of American astronauts are mentioned, both events having occurred during 1962. This confusion, however, does not detract from the overall success of the book.

Finally, one can only ask if a book like SPACE FLIGHT REPORT TO THE NATION succeeds in its aim. Does it communicate the history, urgency and expectations of the space program? Does it at the same time serve as a source of reference, not only to the public, but to the scientist? The book certainly serves the firmer purpose, and does, for the latter, serve as an historical and valuable reference to the initial goals and present expectations.



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SPACE FLIGHT REPORT TO THE NATION is the Main Selection of The Library of Science for November 1962.



UNDER THE MOUNTAIN WALL



In a hidden valley of great beauty, beyond the framework of our modern sense of time, is a people until now untouched by civilization — the Kurelu, a people still living in the world of the Stone Age. *Under the Mountain Wall* is the fascinating account of their life during two seasons, as recorded during the Harvard-Peabody Expedition to New Guinea in 1961 — an expedition that offered a unique chance, perhaps the last, for a day-to-day account of a lost culture in all its primitive simplicity, beauty and terror.

Armed patrols and missionaries have invaded the valley on the heels of the expedition, and with the publication of this account, the Kurelu will be no more than another backward people, crouched in the long shadow of the white man.

Exploiting the full range of his great gifts as a novelist and as a keen observer of the wilderness, Peter Mattiessen brings to the reader a moving sense of the "newness," the purity and innocence, of this strong and proud people, and of the common emotions, needs and desires that we share. Expressly avoiding all reference to the tribe's exposure to the white man, Matthiessen skillfully integrates important anthropological data gathered on the expedition within his narrative.

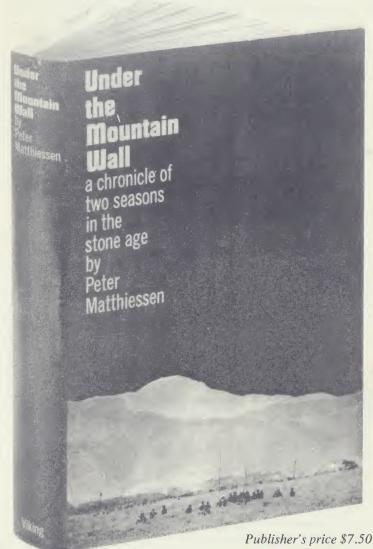
Under the Mountain Wall is the story of the warrior Weaklekek and the swineherd Takum, of U-mue and his family, of their enemies and friends; it tells of what actually happened to these Kurelu tribesmen, called by these names, in the last spring and summer of their history. It follows them in their daily round of work and play, gardening and wood-gathering, rituals and wars,

continued on back page

Extra Selection:

Under the Mountain Wall

by Peter Matthiessen



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feast and funerals. It shows their magnificent war decorations of shells and fur and feathers. It is present at their councils, joins the children in their games, wanders through the beauty of their countryside.

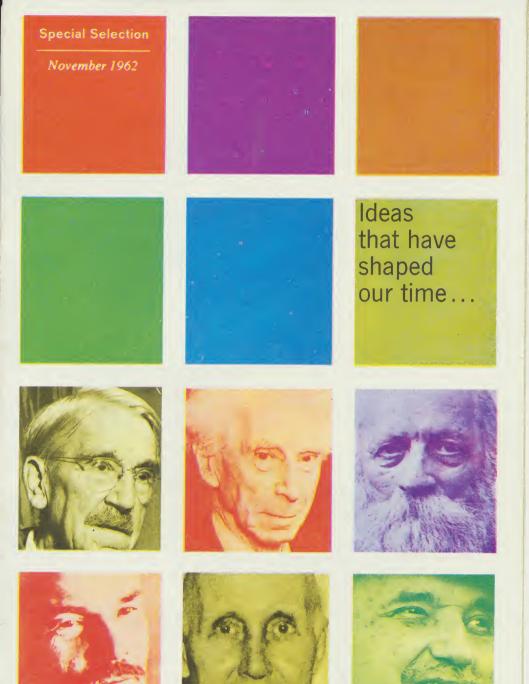
This vivid chronicle of a genuine Stone Age people — augmented by 32 pages of striking photographs (including those of famed *Life* photographer Eliot Elisofon), a full-color frontispiece, a front endpaper after a drawing by Michael Rockefeller (who was lost while on this expedition), a glossary of local names and words, and decorative drawings of native artifacts — is the first material on the Harvard-Peabody Expedition available in book form. Authoritative and eminently readable, *Under the Mountain Wall* is, in the opinion of our editors, "must" reading for anyone interested in one of the most fascinating chapters in the cultural development of man.

About the Author

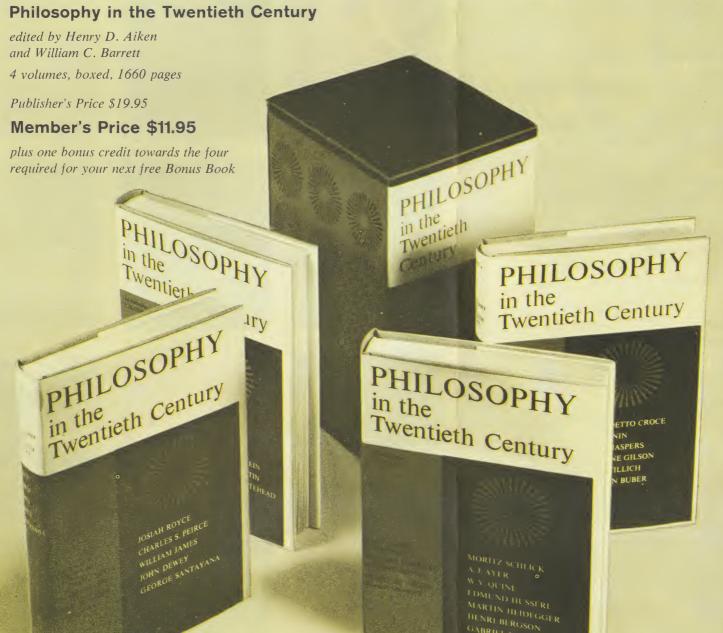


PETER MATTHIESSEN, noted novelist as well as naturalist, has extensively explored both the North and South American continents to gather material for his important works on natural history, wild life and explorations (WILDLIFE IN AMERICA; THE CLOUD FOREST). One of the founders of PARIS REVIEW, and its fiction editor, Mr. Matthiessen has won the ATLANTIC "First" Award for a short story.

UNDER THE MOUNTAIN WALL is the Selection of The Library of Science for November 1962



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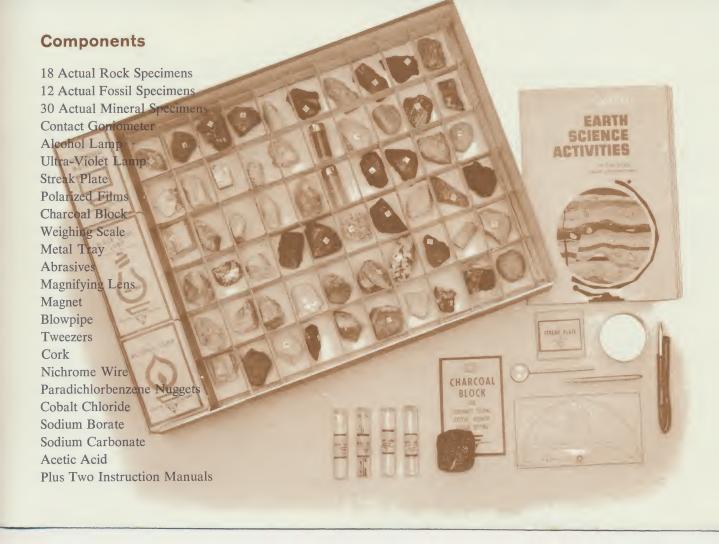
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EARTH SCIENCE ACTIVITIES LAB is the Alternate Selection of the Library of Science for October, 1962 is available in addition to or instead of the Main Selection.

In the two decades since the publication of AN AMERICAN DILEMMA, Gunnar Myrdal's report has had a phenomenal impact on the developing panorama of Negro-white relationships in America — and, indeed, throughout the world. The massive study has been the starting point of the most significant work in the field; it has, in fact, operated as a powerful catalyst in the evaluation and implementation of new developments in our social "drama" of racial relationships.

This Anniversary edition of AN AMERICAN DILEMMA includes a new preface by Swedish social economist Myrdal, placing the work in its proper perspective as one of the most significant undertakings in social science in our time. Arnold Rose, a chief assistant to Dr. Myrdal in the original project, also provides a lengthy supplement which dissects the changes that have taken place in the twenty years since initial publication, and serves as a precise and pointed gauge of interracial progress in the United States.

Part of the historic importance of AN AMERICAN DIL EMMA stems from the immensely broad and detailed scope of the study. Each of the areas examined in the original publication still plays a vital role in today's racial crisis — from Albany, Georgia to Englewood, New Jersey. The book treats every significant aspect of the problem, from its roots in the "American conscience" through the economic and political structure of the Negro community to the maturation of Negro protest movements.

Perhaps no better commendation for AN AMERICAN DILEMMA can be found than a comment by Robert Lynd at its first appearance: "You will find this the most penetrating and important book in our contemporary American civilization that has been written. Here we Americans are revealed, clad in our patchwork 'American Way,' attempting to live along with the vast and ugly reality of what Dr. Myrdal calls our 'greatest failure,' the Negro problem. The resulting analysis probes so deeply and so surely that no one at all concerned with American democracy can miss reading and pondering this book."

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November 1962

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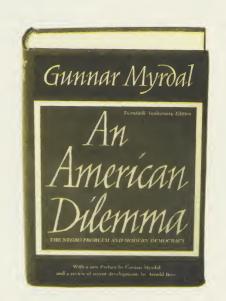
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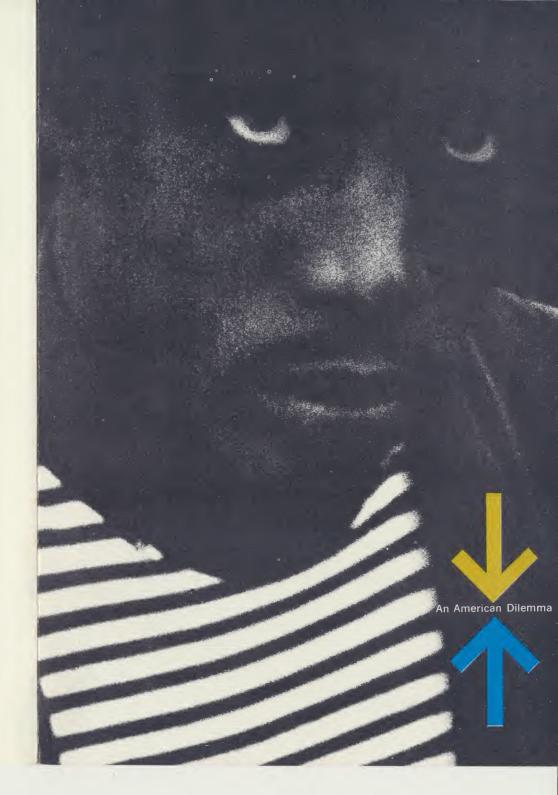


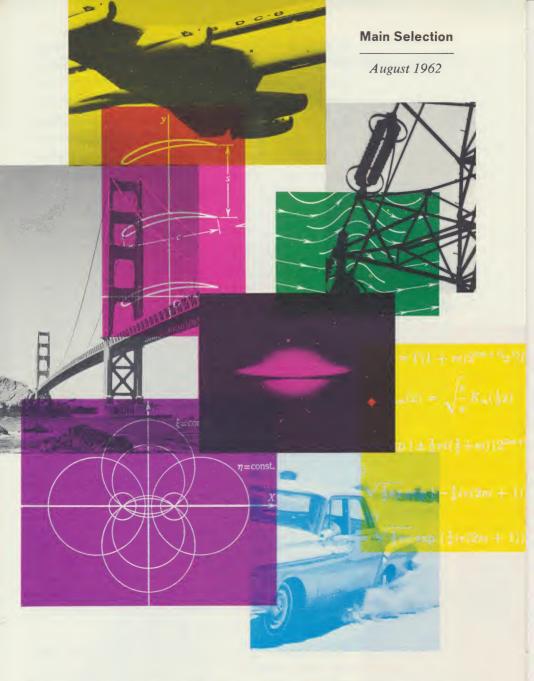


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- Part 1. The Approach: American Ideals and the American Conscience; Encountering the Negro Problem; Facets of the Negro Problem.
- Part 2. Race: Racial Beliefs; Race and Ancestry; Racial Characteristics.
- Part 3. Population and Migration.
- Part 4. Economics: Economic Inequality; The Tradition of Slavery; The Southern Plantation Economy and the Negro Farmer; Seeking Jobs Outside Agriculture; The Negro in Business, the Professions, Public Service and Other White Collar Occupation; Income, Consumption and Housing.
- Part 5. Politics: Underlying Factors; Southern Conservatism and Liberalism; Trends and Possibilities.
- Part 6. Justice: Inequality of Justice; The Police and Other Public Contacts; Courts Sentences and Intimidations.
- Part 7. Social Inequality: Patterns of Social Segregation and Discrimination; Effects of Social Inequality.
- Part 8. Social Stratification: Caste and Class; The Negro Class Structure.
- Part 9. Leadership and Concerted Action: The American Pattern of Individual Leadership and Mass Passivity; The Negro Protest; Negro Popular Theories; Negro Improvement and Protest Organizations; The Negro Church; The Negro School; The Negro Press.
- Part 10. The Negro Community: Institutions; Non-Institutional Aspects of the Negro Community.
- Part 11. An American Dilemma: The North Moves Toward Equality; International Aspects; America's Opportunity.

AN AMERICAN DILEMMA, Alternate Selection of The Library of Science for November 1962, is available in addition to or instead of the Main Selection.





Dictionary of Applied Mathematics

1177 oversize pages/31 separate fields/over 8000 entries

Today's scientists have become, in the words of a recent New York Times article, "rather like moles, burrowing blindly in separate tunnels, quite unaware of what is going on in the tunnels nearby."

A major cause of this alarming lack of communication is — as Morris Kline points out in his review (see below) — the difficulty scientists in one field encounter when they attempt to plunge into the language of another.

Since mathematics has been aptly termed the international language of science, one of the more hopeful signs for free-flowing future communication between scientists in different specialties is the appearance of the monumental volume that is our current Selection.

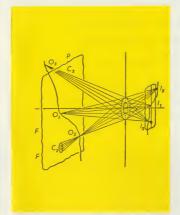
An undertaking which for size and scope alone is unrivalled in its field, THE INTERNATIONAL DICTIONARY OF APPLIED MATHEMATICS ranks, in our editors' opinion, as one of the most significant recent efforts to provide a bridge of understanding and communication between scientists for whom professional isolation ultimately means intellectual sterility.

As J. Robert Oppenheimer eloquently put it a few years back, "The specialization of science is an inevitable accompaniment of progress; yet it is full of dangers and it is cruelly wasteful, since so much that is beautiful and enlightening is cut off from most of the world. Thus it is proper to the role of the scientist that he not merely find new truth but communicate it to his fellows."

a review by Morris Kline

Professor of Mathematics, Courant Institute of Mathematical Sciences, New York University; author of Mathematics and the Physical World, Mathematics in Western Culture, and other books

The increase in the number of branches of science today and in the variety of problems within each branch has forced scientists to specialize — with the result that even the language of one branch is foreign to the worker in







another. This is actually a professional hazard to the scientist because it bars him from following related developments which may be essential to his own progress.

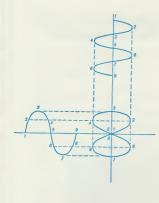
It is clear the scientist will have to develop the habit of utilizing tools analogous to the dictionaries, thesauri and encyclopedias which have long been indispensable tools to the literary man.

Though technical dictionaries have appeared in the past, they have been of limited value because they present merely one or two verbal equivalents. Current publications are giving recognition to the growing need for more helpful and more thoughtfully designed aids.

THE INTERNATIONAL DICTIONARY OF APPLIED MATHE-MATICS is an excellent aid. It does indeed cover concepts of applied mathematics, but it also covers the concepts of thirty-one basic branches of physics and engineering. Also included are terms of pure mathematics, as opposed to the experimental. Entries range from very elementary to advanced, from simple concepts such as the algebraic equation to tensors, and from mass to relativistic mass, boundary layer theory, quantum electrodynamics and quantum field theory. Naturally the more advanced topics presuppose the appropriate background.

This dictionary contains many fine features. Though the editors have clearly recognized the distinction between a dictionary and an encyclopedia, the more involved entries are discussed with surprising fullness. Some, such as the articles on relativity and relativistic quantum field theory, extend over as much as three pages. This permits very helpful descriptions of concepts as well as explanations of mathematical methods used in the applied fields. For example, the solution of some types of differential equations, the use of the Laplace and the Hankel transforms, and the derivation of Kepler's laws are clearly and succinctly described. The same item is listed under various subject heading with cross-references to the key heading. Another excellent feature is an addendum of foreign



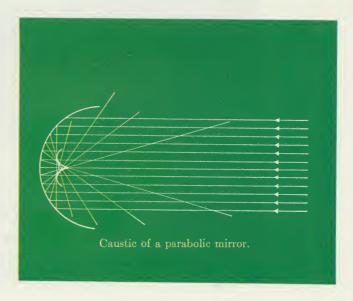


language terms in French, German, Russian and Spanish with English equivalents. The type throughout is large and very readable.

A few topics, such as the calculus and differential equations, which are the heart of applied mathematics and the center of gravity of mathematics proper, seem to be slighted, but only if one judges by the articles under those headings. Actually any number of definitive articles cover the key concepts of these fields and enter into rather fine detail. Nevertheless it would be helpful if such key items as the calculus and differential equations made reference to all the relevant specialized articles.

All told, however, THE INTERNATIONAL DICTIONARY OF APPLIED MATHEMATICS is a valuable and unique tool. To the professional scientist and engineer it offers an excellent aid in improving his effectiveness; for the prospective scientist an enhanced vocabulary is the first step in the acquisition of scientific knowledge. The high level of the contributing staff assures both levels of reader that they will be acquiring sound information.

For list of contributors, see reverse side.



The Main Selection:

International Dictionary of Applied Mathematics

W. F. Freiberger, Editor in Chief 29 contributing editors 1177 pages, double-columned Page size 7¼ by 10 inches More than 8,000 entries



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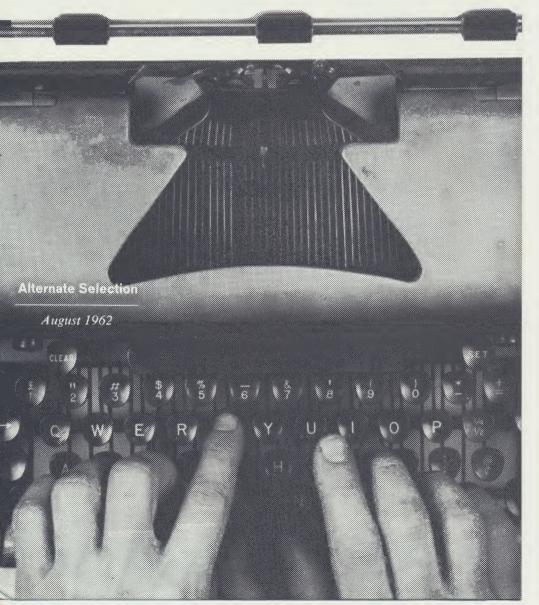
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scientific and technical

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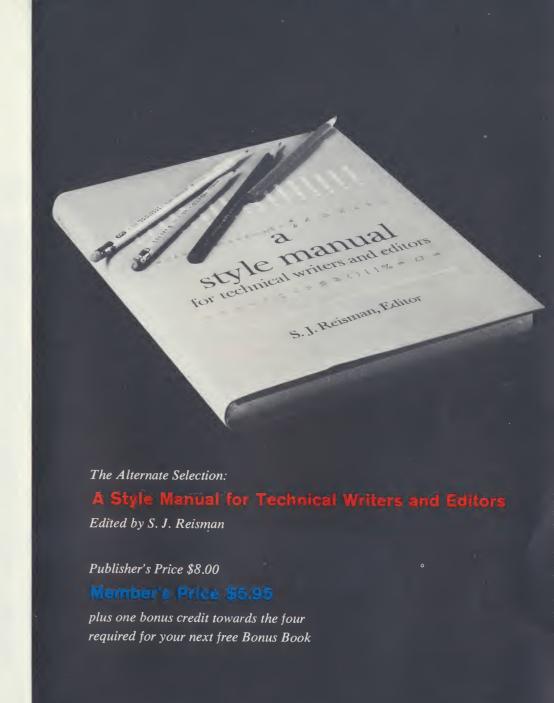
"Good technical writing is most often characterized by an uncomplicated, direct style and by careful diction. Consider, for example, such science classics as Faraday's Researches in Electricity, Millikan's The Electron and Bragg's The World of Sound. The writing in these books is clear, concise and well organized; the language never interferes with the ideas. Such clarity did not just happen."

That "such clarity" may happen a little more often is the aim of this newly published volume — the first complete, specific, how-to-do-it handbook ever compiled for the scientist, researcher or technical worker confronted with the necessity of putting his ideas, findings, or proposals into black-and-white.

From the very start of the process — the actual committing of thoughts to paper — to the ultimate appearance of the printed book, article, paper, pamphlet or memorandum, A STYLE MANUAL FOR TECHNICAL WRITERS AND EDITORS covers the subject compactly, clearly and, happily, with model clarity and more than a touch of humor.

Does your thought apparatus jam when a sentence is fed into it, so that the words run on indefinitely and you can find no way to control them with periods, semi-colons, dashes and similar contrivances? Do you find footnotes, references, figure "callouts" and bibliographic citations milling angrily about you, so that you are unable to pen them in, herd them about, or make them just go away? Are you secretly resentful of editors, suspicious of typists, defensive towards indexers, and at a total loss when dealing with printers? Every one of these common problems is dealt with — logically, plainly and helpfully — in A STYLE MANUAL. Illustrations, cartoons, charts and diagrams abound throughout the airy, cleanly-set pages, making the book physically attractive and a pleasure to read.

continued on page 4



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Scientific research into the origins of mental deficiency is mounting in the United States, which now counts more than five million mentally retarded among its population, according to figures released this spring by the Department of Health, Education and Welfare.

The scientific route to understanding of mental deficiency in its various forms has, in our society, traditionally been quantitative and descriptive. Other nation's scientists, however, take different routes.

In the Soviet Union, for example, owing largely to the pervasive influence of the great Nobel Prizewinning physiologist Pavlov, the emphasis is on the qualitative and the dynamic.

oligophrenia, a newly translated presentation of the findings of one of the U.S.S.R.'s leading investigators of mental deficiency in children, is a work of unusual interest for the increasing numbers of American researchers concerned with this subject. It ranks as such on several counts: the intensiveness of Dr. Pevzner's more than twenty years of study of retarded children; the sensitive quality of her observations; the characteristically Russian method of her presentation — all too unfamiliar to Western scientists still.

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For a comment by Richard L. Masland, see page four

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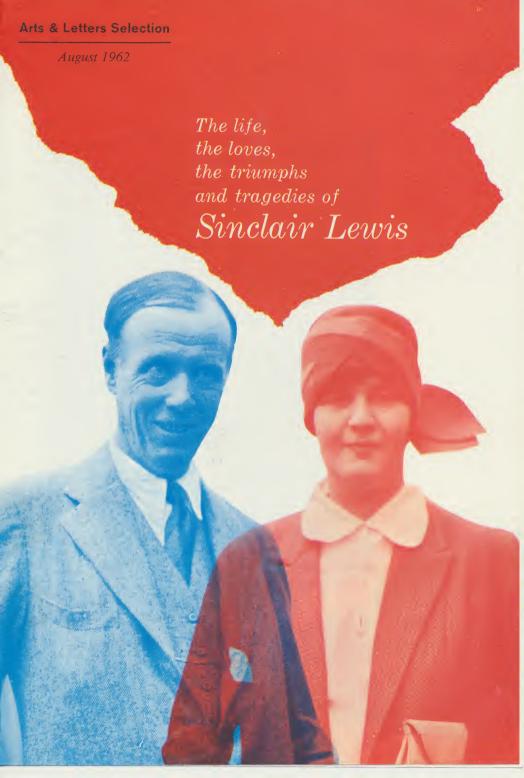
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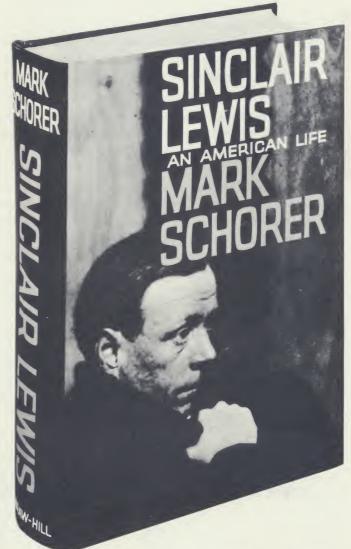
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(continued from page two)

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Yet Kazin's true effectiveness in Contempotemporary naturalists. raries rests less in his ability to analyze individual works or authors than in his perception of the forces at work in literature. Whether he is outlining the background of modern literature, examining Freud and his consequences in life and art, or solving the puzzles of contemporary mores and values, Kazin comes precisely to terms with the relationship of society and the artist. It is this fact that permits him to judge effectively the appeal of Salinger, what he considers the ultimate failure of such novelists of manners as Marquand and O'Hara, and the hollowness of what he calls "the alone generation" in their presentation of characters "so soft, so wheedling, so importunate" that they cannot be

While his critical vision is best at identifying the points of contact between American society and American writers (he is particularly strong on the problems of the Jewish and Negro writers in America), Kazin skillfully applies the same technique to Sholom Aleichem, Isaac Bashevis Singer and Thomas Mann. It is always a matter with him of seeing literature as part of a large culture, so that he is able to infer moral judgments even from the mass of rhetoric that accompanied the Civil War.

Beyond all this, there is Kazin's superb writing ability. He is never dull, and he is always personally involved - whether in his critical judgments or his travel essays on Israel, Russia, Germany and Puerto Rico. He invites response (his essay on Puerto Rico enraged both the islanders and his colleagues at the university), and that is perhaps the finest testimonial to any critic.

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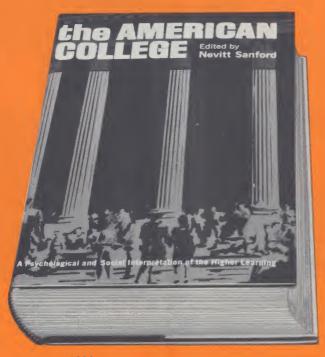
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A Review by WILTON M. KROGMAN

Professor and Chairman, Physical Anthropology Department, University of Pennsylvania

T IS,I think, a miracle of human potential that there arose, *independently*, in the Western Hemisphere three great peoples: The Aztec of Mexico; the Maya of Yucatan; and the Inca of Peru. They all achieved greatness. We can but ponder how far they would have developed had not they been cut down by the Spanish Conquests — Aztec in 1519 A.D. by Cortes, Maya in 1527 A.D. by de Montejo, Inca in 1532 A.D. by Pizarro. The story, in its entirety, is here told by Victor W. von Hagen, who prefers to be known as an "archaeological historian." For thirty years he has dug in both the soil of Central and South America and in the libraries of the world. Many popular books have come from his pen; THE ANCIENT SUN KINGDOMS OF THE AMERICAS is, in a sense, a distillate of them all.

Who were these people? Basically all were descendants of the first Mongoloids who came to the Americas via the Behring Straits some 30,000 years ago. For about 28,000 years the forces of natural selection operated to give rise to numerous tribes. Then, suddenly, cultures in Central and South America flowered.

In 1168 A.D. the Tenochas (Aztecs)—some 3,000 of them—entered the Mexican lake area of Anahuac. They were a short, stocky people (males 5'3", females 4'8"), but they were conquerors, superseding the Olmecs, Mixtecs, Huastecs and Totonacs who for some 500 years had developed their own ways of doing. The Aztecs were a tribute state governed and taxed via a clan system.





Their social structure was oriented to war and religion, the two almost inseparable. The sun god was central and was a bloody one! In 1486 A.D., 20,000 victims were sacrificed.

The Aztecs developed massive pyramid structures; they had water engineering and sanitation. Their sculpture was magnificently realistic, and their metal work and feather-weaving were of the highest order. The calendar was "at the base of every action of the Aztec." There was a ritualistic calendar of 260 days, a solar calendar of 365 days (with 15 months of 20 days each — the odd five days were omitted as "unlucky"). With a least common multiple of 260 (20×13) and 365 (primes = 5 and 73) there resulted 18,980 days, or a 52-year cycle.

The Maya, of obscure origin, go back to about 2000 B.C. By 800 A.D. they numbered about three million. The males were robust, 5'1", the females comely, 4'8". They were a theocracy, and possessed a two-layered social structure—"higher" and "lower" classes. They were maize farmers and were taxed in service raising maize. They had a glyph-script language and ideographic writing. Their calendar reckoned back 23,040,000,000 days; they were "preoccupied with time and its consequences." Their architecture emphasized sculptural details and their painting focussed on realistic frescoes. They emphasized a blood-centered religion that permeated all aspects of daily life.

The Inca or Quechua of Peru were late-comers. They conquered the pre-Inca Chavin, Mochica, Paracas, Nazca, Tiahuanaco and Chimu, the latter flourishing A.D. 1000-1466. They were of medium height, stocky and deep-chested. They were the "organizers rather than the creators of Peruvian civilization." Taxation was via service. Crime was an offense against the Inca (the Emperor) and hence was more a sacrilege than a civil offense. The Inca had an accomplished "neurosurgery," if we may judge by the number of successfully trephined skulls. Inca governmental centralization was facilitated by a very efficient courier system along royal roads 24' wide and 3250 miles in extent.

Thus the American Sun Kingdoms! Von Hagen follows the same general format for each of the three groups, presenting data on origins, land and climate, social organization, speech, marriage, housing, daily living pattern, the calendar and time, agriculture, taxes (paid by service), weaving, pottery, the marketplace, communication and transportation, festive days, dance and music, games, religious belief and organization, law and justice, medical practices and medicinal plants and a final summary of basic achievements of each civilization. All this is history well told, and fascinatingly woven into patterns of conquest, achievement, dominance and decay.

The lessons of history are less in its events, more in its circumstances. Could it happen here?... or there?... or again?





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About the Author

Since 1930, VICTOR W. VON HAGEN, the distinguished American ethnographer and archeological historian, has conducted many expeditions into the lands that formed a part of these Sun Kingdoms. Author or editor of more than forty books about Latin America's past and the men who have rediscovered it, Mr. von Hagen's latest work—the current Selection—is the fruit of that devoted research.

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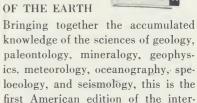
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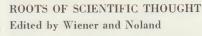
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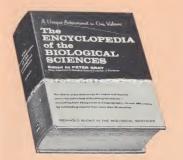
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